Claims

[c1] A method for forming an OLED device comprising:
forming a device layer on a substrate;
patterning the device layer to form pillars along a first direction on the substrate, wherein the pillars comprise a tapered profile, and grooves between the pillars extend outside an electrode region to prevent electrical shorting;
coating the substrate with a solution comprising an organic functional material dissolved in a solvent, the pillars being inert to the solvent;
removing the solvent to form an organic functional layer; and
depositing a conductive layer in the electrode region on the substrate, wherein the tapered profile of the pillars separate the conductive layer into first and second distinct portions.

[c2] The method of claim 1 wherein a distance D is provided between the edge of the active region and ends of the grooves.

[c3] The method of claim 2 wherein D is at least 300 μ m.

[c4] The method of claim 2 further comprises mounting a cap on the substrate to hermetically seal the OLED device.

[c5] The method of claim 4 wherein the substrate comprises a flexible substrate.

[c6] The method of claim 5 wherein the substrate comprises electrodes in a second direction on a surface thereof.

[c7] The method of claim 6 wherein the functional organic material comprises a conjugated polymer dissolved in a solvent.

[c8] The method of claim 1 wherein the device layer comprises a photosensitive device layer, the photosensitive layer is patterned by exposing and developing the photosensitive device layer.

[c9] The method of claim 8 wherein the photosensitive layer comprises a positive photosensitive layer, wherein exposed portions of the photosensitive layer are removed during developing.

[c10] The method of claim 9 wherein exposing comprises successively exposing the photosensitive layer with electrons or charged particles having different energies which have different penetration depths to form pillars with the tapered profile during developing.

[c11] The method of claim 8 comprises curing the pillars to render the pillars inert against the solvent.

[c12] A method for forming an OLED device comprising:
forming a device layer on a substrate;
patterning the device layer to form pillars along a first direction on the substrate, wherein the pillars comprise a tapered profile, and grooves between the pillars extend to edges of the substrate to prevent electrical shorting;
coating the substrate with a solution comprising an organic functional material dissolved in a solvent, the pillars being inert to the solvent;
removing the solvent to form an organic functional layer; and
depositing a conductive layer on the substrate, wherein the tapered profile of the pillars separate the conductive layer into first and second distinct portions.

[c13] The method of claim 12 further comprises mounting a cap on the substrate to hermetically seal the OLED device.

[c14] The method of claim 12 wherein the substrate comprises a flexible substrate.

[c15] The method of claim 12 wherein the substrate comprises electrodes in a second direction on a surface thereof.

[c16] The method of claim 15 wherein the functional organic material comprises a conjugated polymer dissolved in a solvent.

[c17] The method of claim 16 wherein the device layer comprises a photosensitive device layer, the photosensitive layer is patterned by exposing and developing the photosensitive device layer.

[c18] The method of claim 17 wherein the photosensitive layer comprises a positive photosensitive layer, wherein exposed portions of the photosensitive layer are removed during developing.

[c19] The method of claim 17 wherein exposing comprises successively exposing the photosensitive layer with electrons or charged particles having different energies which have different penetration depths to form pillars with the tapered profile during developing.

[c20] The method of claim 19 comprises curing the pillars to render the pillars inert against the solvent.